PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Hironori Kakiuchi et al.
Application No.	:	10/717,831
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For	:	OPTICAL RECORDING MEDIUM

Examiner	:	Martin J. Angebranndt
Art Unit	:	1795
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Mail Stop Appeal Brief - Patents
Commissioner for Patents
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APPELLANT'S BRIEF

Commissioner for Patents:

This brief is in furtherance of the Notice of Appeal, filed in this case on June 11, 2008. The fees required under Section 41.20(b)(2), and any required request for extension of time for filing this brief and fees therefor, are dealt with in the accompanying transmittal letter.

I. REAL PARTY IN INTEREST

TDK Corporation is the assignee of the present application and is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF CLAIMS

Claims 1-3, 7, 10, 13, 16, 19, 22 and 25 are pending. Claims 4-6, 8-9, 11-12, 14-15, 17-18, 20-21 and 23-24 are canceled. Claims 1-3, 7, 10, 13, 16, 19, 22 and 25 were rejected

in the Final Office Action mailed March 13, 2008. The rejections of claims 1-3, 7, 10, 13, 16, 19, 22 and 25 are appealed.

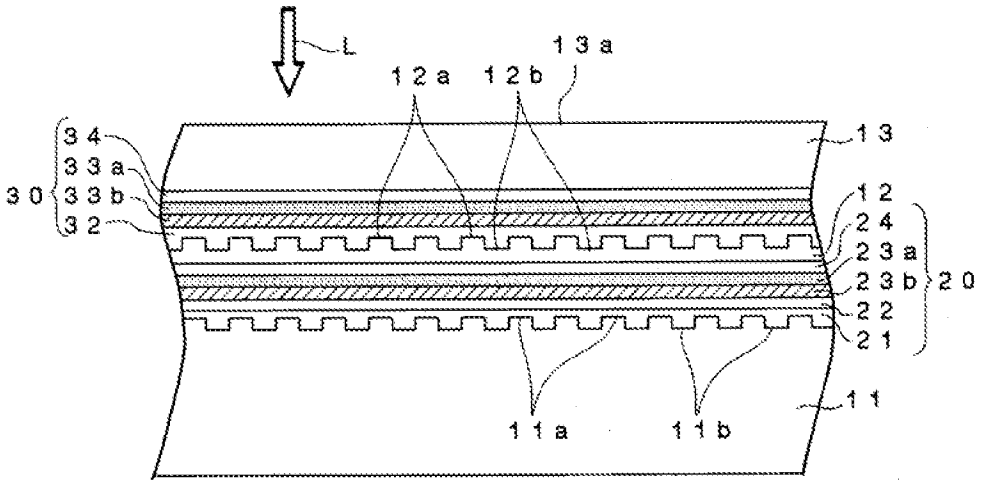
IV. STATUS OF AMENDMENTS

There are no outstanding amendments. The last amendment was filed on December 20, 2007, and a Final Office Action was subsequently issued on March 13, 2008, with this appeal now being filed in response to said Final Office Action.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The inventions claimed herein relate to optical recording media, and, in particular, to optical recording media comprising a plurality of recording layers. Such optical recording media often present a challenge in that the composition of those recording layers (*e.g.*, the recording layer 30 in Figure 2 below, excerpted from the specification) (hereinafter, "shallow recording layers") other than the recording layer farthest from the light incidence plane must balance a number of competing concerns. First, dielectric films formed in the shallow recording layers should provide a high refractive index to improve the output from these recording layers, while balancing this high refractive index against increases in the extinction coefficient of the dielectric films. Second, the dielectric films should provide a high thermal conductivity to improve the signal characteristics of the shallow recording layers. *See* Specification at p. 4, l. 6 – p. 5, l. 3.

FIG.2



The present application describes an optical recording medium having multiple recording layers, which, in certain embodiments, effectively balances the above concerns. The following summary discusses independent claim 1, with reference numerals from Figure 2 in brackets. The information in the parentheses below provides specific page and line references to at least some of the example embodiments corresponding to the elements recited in the claim. Of course, the reference numerals and parenthetical information are illustrative only and are not intended to limit the claim to the exact embodiments shown and described in the specification and figures.

Claim 1 recites:

An optical recording medium comprising a substrate [11] (Specification at p. 16, ll. 7-12), a protective layer [13] (Specification at p. 16, ll. 7-12) and a plurality of information recording layers [20, 30] (Specification at p. 16, ll. 7-15) between the substrate and the protective layer which are laminated via at least one intermediate transparent layer [12] (Specification at p. 16, ll. 7-12) and capable of recording data in the plurality of information recording layers and reproducing data recorded in the plurality of information recording layers by projecting a laser beam [L] (Specification at p. 16, ll. 16-20) via a light incidence plane [13a] constituted by one surface of the substrate (Specification at p. 63, ll. 3-6) or one surface of the protective layer (Specification at p. 16, ll. 21-23) onto the plurality of information recording layers, at least one information recording layer [30] other than a farthest information recording layer from the light incidence plane among the plurality of information recording layers including at least one recording film [33a, 33b] (Specification at p. 16, ll. 21-24), a first dielectric film [34] (Specification at p. 16, ll. 21-24) located on a side of the light incidence plane [13a] with respect to the at least one recording film and containing an oxide as a primary component and added with nitrogen (Specification at p. 32, ll. 26-28), and a second dielectric film [32] (Specification at p. 16, ll. 21-24) located on an opposite side of the light incidence plane [13a] with respect to the at least one recording film and having a lower thermal conductivity than that of the first dielectric film (Specification at p. 25, ll. 15-19), wherein the at least one information recording layer is constituted by a first recording film [33a] (Specification at p. 16, ll. 21-24) containing one element selected from a group consisting of Si, Ge, Sn, Mg, In, Zn, Bi and Al as a primary component (Specification at p. 9, ll. 11-14 and p. 59, l. 24 – p. 60, l. 2) and a second recording

film [33b] (Specification at p. 16, ll. 21-24) provided in a vicinity of the first recording film (Specification at p. 58, ll. 22-28) and containing one element selected from a group consisting of Cu, Al, Zn, Ti and Ag and different from the element contained in the first recording film as a primary component (Specification at p. 9, ll. 14-18 and p. 60, ll. 3-10) and when the laser beam is projected, the element contained in the first recording film as the primary component and the element contained in the second recording film as the primary component are mixed with each other, thereby forming a record mark (Specification at p. 58, l. 22 – p. 59, l. 5).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-3, 7, 10, 13, 16, 19, 22 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent application publication no. 2001/0021160, to Shuy *et al.* (hereinafter, "Shuy"), in view of U.S. patent application publication no. 2002/0168587, to Sakaue *et al.* (hereinafter, "Sakaue") and U.S. patent no. 4,682,321, issued to Takaoka *et al.* (hereinafter, "Takaoka").

VII. ARGUMENT

In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *See, e.g., In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). *See also* M.P.E.P. § 2143.03 (stating that all words in a claim must be considered in judging the patentability of that claim against the prior art).

The rejection of claims 1-3, 7, 10, 13, 16, 19, 22 and 25 does not meet these requirements for *prima facie* obviousness, since the cited references (whether singly or in combination) do not teach or suggest all of the claim limitations of independent claim 1.

Cited References Fail to Show the Claimed First Dielectric Film

Independent claim 1 recites, *inter alia*, an optical recording medium having "a first dielectric film located on a side of the light incidence plane with respect to the at least one recording film and containing an oxide as a primary component and added with nitrogen." Such an arrangement is not disclosed, taught or suggested by the combination of Shuy, Sakaue and Takaoka.

The Examiner relies upon Sakaue to show the claimed first dielectric film. *See* Office Action of March 13, 2008, p. 2. However, Sakaue discloses a very different arrangement for its dielectric layers. In working example 1 and Figure 1 of Sakaue, dielectric layers 12, 16 are formed between a disk substrate 11 (which defines the light incidence plane) and a reflective layer 17. *See* Sakaue, paragraphs [0054-0062]. The first dielectric layer 12 is formed between the light incidence plane and a recording layer 14 and is a $ZnS\text{-}SiO_2$ film. Sakaue, paragraph [0059]. "[A]n oxide or nitrooxide of Ta [may be used] for the second dielectric layer [16]," formed between the recording layer 14 and the reflective layer 17. Sakaue, paragraph [0061]. Sakaue teaches that this particular location for the nitrooxide of Ta, *inter alia*, helps to address corrosion of the reflective layer 17. *See* paragraphs [0037], [0050] and [0112-0114].

In contrast, the first dielectric film of claim 1, which contains oxide as a primary component and is added with nitrogen, is located between the light incidence plane and the at least one recording film. The $ZnS\text{-}SiO_2$ film of Sakaue located between the light incidence plane and the recording layer 14 does not include nitrogen. Meanwhile, the nitrooxide of Ta of Sakaue is formed not between the light incidence plane and the recording layer 14, but between the recording layer 14 and the reflective layer 17. Thus, Sakaue does not disclose, teach or suggest "a first dielectric film located on a side of the light incidence plane with respect to the at least one recording film and containing an oxide as a primary component and added with nitrogen."

Moreover, moving the nitrooxide of Ta taught by Sakaue away from the reflective layer 17 would render this dielectric layer unsatisfactory for its intended purpose of preventing corrosion of the reflective layer 17. Therefore, claim 1 cannot be rendered obvious in view of Sakaue. *See* M.P.E.P. § 2143.01 ("If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.").

The Examiner has not provided any arguments that Shuy or Takaoka supply this teaching of the first dielectric layer, and it is submitted herein that neither Shuy nor Takaoka disclose, teach or suggest the claimed first dielectric layer.

Cited References Fail to Show the Claimed Second Dielectric Film

Independent claim 1 further recites, *inter alia*, "a second dielectric film located on an opposite side of the light incidence plane with respect to the at least one recording film and having a lower thermal conductivity than that of the first dielectric film." Such an arrangement is not disclosed, taught or suggested by the combination of Shuy, Sakaue and Takaoka.

The Examiner appears to rely upon Sakaue to show the claimed second dielectric film. However, as set forth above, in Sakaue, the first dielectric layer 12 is a ZnS-SiO_2 film, and the second dielectric layer 16 may comprise a nitrooxide of Ta. Sakaue, paragraphs [0054-0062]. Sakaue further discloses that "nitrooxides of Ta have substantially the same optical constants as ZnS-SiO_2 and their thermal conductivity is better than that of ZnS-SiO_2 (i.e. they have better heat releasing ability)." Sakaue, paragraph [0037]. Thus, in Sakaue, the second dielectric layer 16 (located on the opposite side of the light incidence plane with respect to the recording layer 14) has a higher thermal conductivity than that of the first dielectric layer 12.

In contrast, the second dielectric film of claim 1 has a lower thermal conductivity than that of the first dielectric film. The second dielectric layer of Sakaue does not satisfy this limitation, and, for the same reasons discussed above, moving the nitrooxide of Ta taught by Sakaue away from the reflective layer 17 would render this dielectric layer unsatisfactory for its intended purpose of preventing corrosion of the reflective layer 17. Thus, Sakaue does not disclose, teach or suggest "a second dielectric film located on an opposite side of the light incidence plane with respect to the at least one recording film and having a lower thermal conductivity than that of the first dielectric film."

The Examiner has not provided any arguments that Shuy or Takaoka supply this teaching of the second dielectric layer, and it is submitted herein that neither Shuy nor Takaoka disclose, teach or suggest the claimed second dielectric layer.

Cited References Fail to Show the Claimed Plurality of Recording Layers

Claim 1 further recites "a plurality of information recording layers between the substrate and the protective layer which are laminated via at least one intermediate transparent layer and capable of recording data in the plurality of information recording layers and reproducing data recorded in the plurality of information recording layers by projecting a laser

beam via a light incidence plane constituted by one surface of the substrate or one surface of the protective layer onto the plurality of information recording layers." Such an arrangement is not disclosed, taught or suggested by the combination of Shuy, Sakaue and Takaoka.

The Examiner relies upon Figures 9 and 10 of Takaoka to show the claimed plurality of information recording layers. Office Action of March 13, 2008, p. 3. However, these Figures disclose two single-sided memory optical disks bonded using a bonding agent 21 to produce a "double-sided memory optical disk." *See* Takaoka, col. 4, ll. 60-64. Thus, Takaoka only teaches double-sided optical disks having two light incidence planes defined by the transparent substrates 11 on either side of Figures 9 and 10.

In contrast, claim 1 recites a plurality of information recording layers which are capable of "recording . . . and reproducing data . . . by projecting a laser beam via a light incidence plane . . . onto the plurality of information recording layers." Takaoka does not disclose, teach or suggest recording to a plurality of information recording layers using a single light incidence plane, but instead teaches two light incidence planes corresponding to the two sides of the double-sided optical disk. Claim 1 further recites "a plurality of information recording layers. . . which are laminated via at least one intermediate transparent layer." Takaoka does not disclose, teach, or suggest that the bonding agent 21 is transparent, nor does Takaoka teach any other intermediate transparent layers.

The Examiner has not provided any arguments that Shuy or Sakaue supply this teaching of the plurality of information recording layers, and it is submitted herein that neither Shuy nor Sakaue disclose, teach or suggest the claimed arrangement.

For at least the above reasons, it is respectfully submitted that claim 1 is allowable over Shuy, Sakaue and Takaoka. Dependent claims 2-3, 7, 10, 13, 16, 19, 22 and 25 are also allowable over these references at least because they include the limitations of independent claim 1.

Respectfully submitted,
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VIII. CLAIMS APPENDIX

1. (Previously Presented) An optical recording medium comprising a substrate, a protective layer and a plurality of information recording layers between the substrate and the protective layer which are laminated via at least one intermediate transparent layer and capable of recording data in the plurality of information recording layers and reproducing data recorded in the plurality of information recording layers by projecting a laser beam via a light incidence plane constituted by one surface of the substrate or one surface of the protective layer onto the plurality of information recording layers, at least one information recording layer other than a farthest information recording layer from the light incidence plane among the plurality of information recording layers including at least one recording film, a first dielectric film located on a side of the light incidence plane with respect to the at least one recording film and containing an oxide as a primary component and added with nitrogen, and a second dielectric film located on an opposite side of the light incidence plane with respect to the at least one recording film and having a lower thermal conductivity than that of the first dielectric film, wherein the at least one information recording layer is constituted by a first recording film containing one element selected from a group consisting of Si, Ge, Sn, Mg, In, Zn, Bi and Al as a primary component and a second recording film provided in a vicinity of the first recording film and containing one element selected from a group consisting of Cu, Al, Zn, Ti and Ag and different from the element contained in the first recording film as a primary component and when the laser beam is projected, the element contained in the first recording film as the primary component and the element contained in the second recording film as the primary component are mixed with each other, thereby forming a record mark.

2. (Previously Presented) The optical recording medium in accordance with Claim 1, wherein the first dielectric film contains Ta_2O_5 or TiO_2 as the primary component.

3. (Previously Presented) The optical recording medium in accordance with Claim 1, wherein the second dielectric film is formed of a mixture of ZnS and SiO_2.

7. (Previously Presented) The optical recording medium in accordance with Claim 1, wherein the second recording film is formed so as to be in contact with the first recording film.

10. (Previously Presented) The optical recording medium in accordance with Claim 1, wherein the first recording film contains Si as the primary component and the second recording film contains Cu as the primary component.

13. (Previously Presented) The optical recording medium in accordance with Claim 1, wherein at least one element selected from a group consisting of Al, Zn, Sn, Mg and Au and different from the element contained in the second recording film as the primary component is added to the second recording film.

16. (Previously Presented) The optical recording medium in accordance with Claim 10, wherein at least one element selected from a group consisting of Al, Zn, Sn, Mg and Au and different from the element contained in the second recording film as the primary component is added to the second recording film.

19. (Previously Presented) The optical recording medium in accordance with Claim 1, wherein the protective layer is formed of a light transmittable material and the laser beam is projected onto the plurality of information recording layers via the protective layer.

22. (Previously Presented) The optical recording medium in accordance with Claim 10, wherein the protective layer is formed of a light transmittable material and the laser beam is projected onto the plurality of information recording layers via the protective layer.

25. (Previously Presented) The optical recording medium in accordance with Claim 10, wherein the second recording film is formed so as to be in contact with the first recording film.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.